



OCCUPATIONAL RADIATION SAFETY SIGNIFICANCE DETERMINATION PROCESS

Inspection Findings and Significance Determination Process

The objective of this cornerstone is to ensure worker health and safety from exposure to radiation from licensed or unlicensed radioactive materials during routine operations of civilian nuclear reactors. The health and safety of workers is assured by maintaining their doses within the limits in 10 CFR 20 and ALARA.

Licensee performance in the cornerstone is assessed by considering the PI indication in combination with inspection findings. A baseline inspection is maintained to verify the accuracy and completeness of the PI data (i.e., work control in radiologically significant areas), supplement the PI data in areas where the PI alone is not sufficient to measure performance (i.e., problem identification and resolution), and complement the PIs with inspection findings of performance for areas not covered by the PI (i.e., ALARA planning and controls, radiation monitoring instrumentation, and personnel dosimetry).

The Significance Determination Process (SDP) is the mechanism in which the significance of individual events (follow-up of an operational occurrence, substantiated allegation, or other inspection finding) can be normalized and combined with the PI results to arrive at an overall cornerstone performance assessment. Logic flow charts are provided to outline the process. A finding that gets through the process (flow chart) without tripping a decision "gate" ends up as a GREEN finding. This does not mean that the performance on this individual finding is good or even acceptable. It still may be a non-conformance or a violation. It does mean that the safety significance of the event is not large enough to warrant further NRC intervention. Licensees are still required to come into compliance with the regulation and their commitments. However, the licensees are given the latitude to self correct these non-conformances.



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ALARA Findings

Section 1101.(b) of 10 CFR Part 20 states that licensees shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses that are as low as is reasonably achievable (ALARA).

Section 1101 of 10 CFR Part 20 requires that each licensee develop, document, and implement a radiation protection program that includes provisions for keeping occupational radiation doses ALARA. As contained in the Statements of Consideration in the May 21, 1991 Federal Register concerning the revision to 10 CFR Part 20, the Commission continues to emphasize the importance of the ALARA concept to an adequate radiation protection program. A licensee's compliance with this requirement will be judged on whether the licensee has incorporated measures to track and, if necessary, to reduce exposures and not whether exposures and doses represent an absolute minimum or whether the licensee has used all possible methods to reduce exposures.

Three metrics are used as screening tools, and if the potential ALARA inspection observation passes through these screens, then a GREEN or more severe ALARA FINDING is made (and documented). The first screen focuses on the accuracy of a licensee's dose goals and the strength of job controls established for specific tasks (jobs). A job dose which exceeds the dose goal by 50% or more is indicative of poor pre-job planning. If the actual job dose falls within the pre-job dose estimate or exceeds it by less than or equal to 50%, then a "NO Finding" results. If the actual job dose exceeds the projected dose by greater than 50%, then the next screen considers plant collective dose.

The next metric chosen for screening potential ALARA finding is the plant's rolling three-year average collective dose (consideration of doses to individuals and individual dose limits are treated in the Exposure Control portions of the SDP). Plants with effective ALARA programs tend to have lower overall collective doses than those which have poor or inadequate ALARA programs. On average the industries current ALARA performance is considered very good. Total collective dose appears to be reaching an equilibrium minimum



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value in the last few years. Therefore, the current (1998 Data) median value of the three-year average (MTYA) collective dose is established as a decision gate standard. Due to the different challenges for BWRs and PWRs, different MTYA values are established for these reactor types. If the plant's average is less than the industry median, then a "no Finding" conclusion is drawn. If the average is greater than the median, then the logic takes you to the final screening gate.

If the actual collective dose for the job is greater than 5 person-rem (PWR) or 10 person-rem (BWR), then you have a FINDING,

The SDP logic sorts findings into WHITE or YELLOW significance bands. If the actual job dose was not greater than 25 (PWR) or 50 person-rem (BWR), and is not the third such occurrence in the last rolling 18-month period, then the finding is GREEN. If this is the third such occurrence, then the finding is WHITE.

If the actual job dose collective dose is >25 person-rem (PWR) or >50 person-rem (BWR), then the finding is either WHITE or YELLOW as a function of plant's rolling three-year average (is it < or > than 2.5 times the median average for BWR or PWR).

Exposure Control Findings

With the exception of shallow dose limits and discrete radioactive particles (DRP), an individual occurrence of the failure to control radiation exposures resulting in dose(s) in excess of the 10 CFR 20 limits is at least a YELLOW finding. For DRPs, exposures in excess of the current enforcement policy will be considered a WHITE finding. Occurrences that result in dose(s) in excess of five (5) times the dose limits are RED finding.



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Breakdowns in the Radiation Protection Program, or unintended exposures, that do not exceed a dose limit can still be considered significant if they constitute a "Substantial Potential for Overexposure." A substantial potential, consistent with the current Enforcement Manual (NUREG/BR-0195, subsection 8.4.1), is an occurrence in which a minor alteration of the, circumstances would have resulted in a violation of Part 20 limits and it was fortuitous that the altered circumstances did not occur. In the SDP the finding can also be a WHITE or YELLOW depending on the dose rates (risk of a serious outcome) associated with the failure. In a Very High Radiation Area of 500 rads/hr, it can take as little as 3 minutes for a worker to receive 25 rem. Note however that the Enforcement Process (and possible civil penalty) will not engage unless the event had an "actual consequence" (in this case an actual overexposure). The Assessment Process rather than the Enforcement Process will determine further licensee and NRC action for events that do not result in "actual consequences."

The last decision gate in the SDP is intended to sort out significant issues and findings related to plant equipment and facilities. The Assessment Program is a risk informed process, and radiation dose is the measure of health risk associated with licensee activities. Therefore, this gate focuses on those issues that could or does compromise the licensees ability to assess dose. Since this gate culls out WHITE findings, it is intended that only significant, programmatic, failures of radiation monitoring and personnel dosimetry trip this gate. Examples of findings intended to be addressed by this gate include; 1) the licensee's failure to use a NVLAP certified dosimeter processor, 2) a generic and uncorrected failure of the DADs to respond to, or record, radiation dose, and 3) improper calibrations of instruments or monitors that significantly bias their response which are used as a basis for establishing protective controls. An individual failure to survey or monitor should be considered as a failure of a radiation safety barrier and evaluated for its potential for unintended dose or substantial potential for overexposure as discussed above.